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THE FREQUENCY AND SIGNIFICANCE OF BACTERIURIA.

by

MAX LIPSCHITZ, M.B., Ch.B.

The recent publication of "Common infections of the Kidney" by Frank Kidd of London has brought the subject of bacteriuria again into prominence. He reviews a series of his cases and enunciates certain far reaching and important views. It was with the object of testing the validity of his views and contentions that this investigation was undertaken. The history of Bacteriuria is a comparatively short one. In 1881 William Roberts first described the condition and divided bacteriuria into four types. He states - "the fresh and healthy urine is perfectly "free from bacteria, or other minute organisms. "The ordinary types of morbid urine though they may "contain blood, pus, or casts of tubes are equally "free from organisms."

The four types of case into which he divided bacteriuria were:-

a. Bacteria with incipient decomposition of the urine.
b. Bacteria with ammoniacal decomposition of the urine.
c. Bacteria without decomposition of the urine.
d. Beaded filaments (micrococcus chains) without decomposition of the urine.

The/

The first type he mentioned is not uncommon in women.

"There are few or no symptoms; is in itself of no "importance, and may persist for years without re- "quiring attention; but it assumes graver significance "if, as I have reason to believe, it renders the "subjects of it liable to the next form of bacteriuria "with ammoniacal decomposition."

The urines of types "c" and "d" were opalescent when voided; and showed little tendency to decompose. "These cases run a long and uninterrupted course "and cause more or less severe irritation of the "urinary passages."

Roberts concluded that the cases depended on the establishment of a colony of bacteria (Bacterium termo) in the urinary bladder, and that the proliferation of the organisms and perhaps certain products of its action as a ferment, gave rise to irritation of the bladder.

Since Roberts' classical description the condition has not infrequently been referred to in Medical literature, and the views have become amplified.

Rovsing states "the Bacillus Coli can cause "Nephritis. It seldom causes acute nephritis, but "usually/

"usually a nephritis of a chronic and insidious form. "The only clinical evidence that one may have of its "existence is a persistent Bacilluria".

In a recent communication on Idiopathic Nephritis, Day and Clarke have shown, that the Colon bacillus was the causal organism. They reproduced the disease with quite definite post mortem appearances in the Kidneys of experimental animals.

Kidd's monograph is of much greater interest than either of the foregoing. He is not concerned with the causation of one or more specific lesions by one or other organism; though of course he does not lose sight of this happening.

His explanation of the presence of bacteria in the urine is that the organisms are absorbed into the blood from the intestines. He believes that this absorption by the blood is of constant occurrence and that people suffer from Intestinal Bacteraemia; and that the organisms are filtered out of the body, and from the blood, by the Kidneys, and are passed out as a bacteriuria.

He maintains that the common Saprophytes of the bowel, the Colon bacillus, the Staphylococcus, and the Streptococcus are constantly being absorbed by the tissues of the body and are there destroyed or got rid of by the excretory channels.

And/

And while Wright believes, that the tissues are sterile, and that organisms exist only on the surface of the body; and that bacteria are found only in the tissues of the body after the surface has been damaged and inflammations have started, Kidd, in direct contradistinction maintains, "the body is a bacterial "sponge, and almost daily takes up into it organisms. "It is only in exceptional circumstances that local "inflammation arises in any organ. This only occurs "when that organ is damaged, or because it, or the "body as a whole has been submitted to excessive "physical stress."

The body may become infected by bacteria in two ways.- The infection may be Exogenous or Endogenous. The exogenous infection arises when the individual ingests or in some other manner comes into contact with infected material or virulent organisms. The endogenous infections arise when what Kidd has termed the "Bacterial balance" is disturbed, by such factors as chill, constipation, worry and fatigue, factors which materially lower both the local and general resistance of the individual.

This view Adami has long adumbrated. He has shown that when the general vitality is lowered organisms can and do pass through the mucous membrane of the intestine, into the blood without there being any/

any local lesion in the bowel. The first barrier of defence against these migrating bacteria is the Liver, and usually this organ can quite ably cope with the bacteria in the portal circulation. But, sharing in the general lowering of vitality the organisms may set up inflammations in the Liver, Gall bladder or bileducts; or some being killed off, others manage to get past this line of defence, enter the blood stream and are filtered off by the Kidney and are passed as a bacilluria.

Of course this is not the only channel by which the Kidney may become infected. Infection by ascent from the Urethra and Ureters; and by extension from the neighbouring tissues such as the appendix, caecum, ascending, transverse and descending Colon are possible. These, however, in comparison to the cases due to blood infection are very uncommon and Kidd has shown that the majority of his cases of chronic Pyelitis were due to a blood borne infection.

This contention is supported by the cases of Infantile Diarrhoea due to Colon bacillus infection; reported by Friedenwald. In his cases the only lesion in the bowel was a slight catarrhal enteritis but the fatal lesion was found to be at post mortem examination a Colon bacillus Pyelo Nephritis. The only manner in which these organisms could have reached/

reached the Kidney is by means of the blood stream.

In cases of Typhoid fever where there is no ulceration of the bowel; the bacilli pass through the mucous membrane and are conveyed by the blood to the Liver and Gall bladder, their presence in these organs cannot be accounted for on any other hypothesis.

Facts such as these lend support to Kidd's view that blood invasion is a common daily occurrence; naturally it follows that the bowel where organisms are most commonly present should be the chief source of origin. Yet the fact must not be overlooked that the blood may absorb organisms from other parts of the body such as the throat, septic teeth or septic foci anywhere in the body, and as long as the individual is in a state of health no untoward symptoms arise, and the organisms will be either digested or thrown out of the body.

Experiments on animals recorded by Albarran and others support the view that the Kidney is most commonly infected from the blood. They injected bacteria into the veins of rabbits and shortly afterwards recovered them from the Kidney and Urine. There was no sign of inflammation of the Kidneys and the conclusion drawn was that the body used the Kidney as a filter to rid itself of the organisms.

Such absolute proof is very difficult to demonstrate/

demonstrate in the human subject. Even in cases of acute disease of the urinary organs such as Pyelitis and Pyelo Nephritis it is seldom possible to demonstrate the infecting organism in the blood. Panton and Tidy have shown that the causal organism is present in the blood just before and during the rigors which occur in these conditions.

The chances of demonstrating bacteria in the blood in even acute conditions are very small; they are still more remote in chronic cases. Kidd and Panton have shown, however, that it is a comparatively easy matter to demonstrate bacteria in the urine; that it is a very common occurrence, and that its significance is not negligible in making a diagnosis in cases of chronic ailment. It is quite possible too, that it is the forerunner of Kidney infection, a fact which Roberts hinted at forty years ago.

The urines which were examined for the present investigation were in no way taken from selected cases. The urine was examined bacteriologically as a matter of routine in every case that came into Dr Chalmers Watson's wards at the Royal Infirmary, Edinburgh.

The appearance of the urine may, to the experienced eye, be indicative of the presence of bacteria in the urine. The urine is of a characteristic opalescent colour and if Colon Bacilli are present it/

it has usually a peculiar fishy odour. A clear urine, however, does not indicate always a sterile one, a fact well demonstrated in the series of urines of children which I examined.

Organisms, if motile, can often be demonstrated from the centrifuge deposit, but their characteristics and nature cannot in this way be definitely ascertained. Sometimes too, a culture made from the centrifuge deposit is sterile, but if such a urine is first incubated with liquid nutrient broth, organisms can usually be demonstrated on subsequent subculture.

It is evident that unless there are clinical signs a bacteriuria will often be overlooked in the ordinary routine examination for the albumin and sugar, and in the absence of these substances a urine is usually classed as normal.

A bacteriuria is present in a great majority of cases and it can easily be demonstrated if the urine is carefully examined bacteriologically.
The urine must of course be carefully collected. The method of collection employed in obtaining the specimens which I examined is the one advocated by Kidd and Panton. In the female the specimen is a carefully drawn catheter specimen. The urine is drawn off into a sterile tube, which is immediately plugged with/

with sterile wool.

In the male the specimen is a carefully taken one. The procedure is as follows. The foreskin is drawn back and the glans and meatus are thoroughly cleansed by means of a mild antiseptic. The patient is asked to pass some urine into a clean receptacle. This washes out any of the local organisms which may be lying in the anterior portion of the urethra. This is discarded. Then, from the middle of the stream, some of the urine which is being passed is collected into a sterile tube which is plugged with sterile wool as soon as the requisite amount has been collected.

Objection may be taken that a specimen so obtained is not a reliable one, and that the chance of contamination from the deep parts of the urethra and from the outside is very great. It is well known that potentially pathogenic organisms are frequently present in the deeper parts of the urethra and organisms from this source may be passed in the urine. Cases of this nature would constitute examples of bacteriuria and as such must be here considered. When a catheter is used organisms from the deeper parts of the urethra may be pushed into the bladder, and in this way a catheter specimen may become "contaminated".

The/

The fact that Melchior has pointed out that only the first inch or so of the anterior urethra is occupied by organisms is a strong argument against the use of the catheter; for these organisms will be effectively washed out by the portion of urine which is discarded.

The urine having been obtained in the manner described it may be bacteriologically examined in either one of two ways. I shall describe first the method of examination commonly employed in some bacteriological laboratories; and then I shall describe the method recommended by Kidd and Panton which was the method I used after some preliminary observations to compare the two methods had been performed.

The first method is as follows, the specimen is centrifugalised in a sterile centrifuge tube. The tube should preferably be plugged with sterile cotton wool, which should be retained in position by a light elastic band. This reduces all chance of contamination to a minimum.

A platinum loopful of the deposit so obtained is transferred on to an Agar Slope; and some on to a Petri dish containing MacConkey's medium. The inoculated tube and dish are then incubated for twenty four hours at 37° Centigrade. Films are made from the growth/

growth obtained from the cultures, and are usually stained by Gram's method.

The method used in obtaining the results for this investigation is as follows. Equal parts of liquid nutrient broth and carefully taken urine are brought into contact. The tube containing this mixture is then incubated at 37° Centigrade for twenty four hours. A film is made from this and stained by Gram's method.

A subculture from the broth culture is now made on to an Agar Slope and on to a Petri dish containing MacConkey's medium. These are incubated for twenty four hours at 37° Centigrade. A film is made from this culture and also stained by Gram's method. The report on a specimen is based on the findings in the subculture.

The preliminary observations to which I have referred were performed as follows. Seven unselected cases were taken and the urines were examined by the two methods above described. It will be seen that in only two of the cases was a growth obtained by the ordinary or first mentioned method; both, were in cases of acute Pyelitis. By the second method a growth was obtained in every instance. The following are the results of seven cases examined.

Sex & Diagnosis.	Culture from Centrifuge deposit after 24 hours incubation.	Broth.	Subculture.
(1) Male Pyelitis	Staphylococcus (Aureus)	Gram positive diplococci	Staphylococcus (Aureus)
(2) Female Pyelitis	Gram neg.Coliform bacilli and Staphylococci.	Gram neg. Coliform bacilli.	Gram neg. Coliform bacilli and Gram pos. diplococci.
(3) F. Uraemia	Sterile.	Large gram positive cocci.	Gram positive diplococci & diphtheroid Bacilli.
(4) F. Mucous Colitis	Sterile.	Large & small gram pos. diplococci.	Staphylococci.
(5) M. Enlarged Prostate.	Sterile.	Large gram pos. Cocci.	Staphylococci.
(6) Male Nephritis	Sterile.	Gram pos. cocci & bacilli.	Gram pos. diplococci & diphtheroid bacilli.
(7) Male Nephritis	Sterile.	Gram pos. diplococci. Some in chains.	Streptococci.

From the observations it seems clear that the second method has obvious advantages. The two methods are as easily performed and by the method of culturing the centrifuge deposit on to a solid medium the chances of obtaining a sterile tube seems greater than by the other method. Risk of contamination in the laboratory is negligible, and as one wishes to find out in a given specimen of urine, whether organisms are present or not, the organisms, if present, should be given every opportunity to grow. This seems to be much more certain if the urine is first incubated with broth. This fact was again demonstrated in some of the specimens of children's urines which I examined. It was to obviate this chance of obtaining an unreliable result that the second method was the one that was used in the investigation.

The following is the complete record of the examinations made. The urines of 105 patients were examined and in most instances a second and confirmatory examination was made. The urine was in every case incubated with an equal amount of broth, this dilution has been found to be a good working one. The description of the organisms under the heading "Broth" refers to the findings of the film made from the/

the broth culture; those under "Subculture" to the findings in the Subculture.

The urine was acid in reaction in nearly all the cases, and this has not been specially indicated. Where the urine was other than acid indication of this has been made. After the broth culture had been made, the urine was in every case centrifugalised and the deposit examined microscopically. The description of the findings, if any, has been added and is indicated under the heading "Mic".

The clinical diagnosis, the sex of patient and the date when the examination was made has been added in every instance. In the description of the organisms I have described the gram negative bacilli as belonging to the Coliform group of organisms. This was confirmed in a number of cases by the biochemical reactions.

No detailed method of differentiating the gram positive organisms was used. Organisms have been labelled Staphylococci and Streptococci in those instances when the examination of both the culture and the gram stained film showed that the organisms appeared to belong to either the Staphylococcal or Streptococcal group of organisms.

In/

In some descriptions of the Subcultures percentages have been used. These percentages refer to the findings of an average field on the slide, the film having been made after the growth on the agar had been thoroughly mixed up by the platinum needle. The whole field is taken to represent 100 and the proportions of organisms was then estimated. This method was only used for convenience of description; and it must be recognised that it is only an approximate estimate of the proportion of the organisms present.

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1. M. Neurasthenia.

Mic.:- A few Epithelial Cells: good number Pus Cells: one or two R.B.C.: Casts and Bacteria:

Broth.
28.9.20. Fair number large gram pos. diplococci.

Subculture.
29.9.20. Pure growth Staphylococcus (Albus).

Broth.
4.10.20. Few gram pos. diplococci.

Subculture.
5.10.20. Fair number gram neg. Coliform Bacilli & fair number of gram pos. diplococci.

2. M. Pneumonia.

Mic.:- Large number Epithelial Cells: one or two Pus Cells. Few R.B.C.: some debris.

Broth.
4.10.20. Few gram pos. diplococci: Few gram neg. Cocco-bacillary forms.

Subculture.
5.10.20. Fair number gram neg. Coliform bacilli: Few gram pos. diplococci.

3. M. Chronic Bronchitis.

Mic.:- Large number Epithelial and Pus Cells:

Broth.
4.10.20. Few gram pos. diplococci.

Subculture.
5.10.20. Extensive growth Staphylococcus (Albus): Few diphtheroid Bacilli.

4. M. Urticaria.

Mic.:- Large number Epithelial Cells. Few Pus Cells: Few R.B.C.: Slight amount of debris.

Broth.
4.10.20. Large number gram pos. diplococci.

Subculture.
5.10.20. Pure growth Staphylococcus (Albus).

5. F. T.B. Peritonitis.

Mic.:- Few Epithelial Cells: good many Pus Cells: Few R.B.C. Few Ca. Ox. Crystals.

Broth.
4.10.20. Good many gram neg. Bacilli.

Subculture.
5.10.20. Extensive growth gram neg. bacilli (B. Coli): Large number gram pos. diplococci.

6. M. Habit Spasm.

Mic.:- Few Epithelial Cells: Fair number Pus Cells.

Broth.
4.10.20. Good many gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
5.10.20. Few gram pos. diplococci: Few gram neg. Coliform Bacilli.

7./

7. M. General Paralysis.

Mic.:- Few Epithelial and Pus Cells: One or two R.B.C. Fair number Ca. Ox. Crystals.

Broth.
5.10.20. Few gram pos. diplococci.

Subculture.
6.10.20. Pure growth B. Pyocyaneus.

Broth.
11.12.20. Few gram pos. diplococci.

Subculture.
12.10.20. Staphylococcus (Aureus): Few gram pos. cocci (Enterococci).

8. F. Colitis.

Mic.:- Few Epithelial and Pus Cells: one or two R.B.C.

Broth.
30.9.20. Few gram pos. diplococci.

Subculture.
1.10.20 Staphylococcus (Albus).

Broth.
4.10.20. Few gram pos. diplococci.

Subculture.
5.10.20. Staphylococcus (Albus).

9./

9. M. Intestinal Obstruction.

Mic.:- Good many Epithelial cells: Fair amount of debris.

Broth.
8.11.20. Small and large gram pos. diplococci.

Subculture.
9.11.20. Pure growth Staphylococcus (Albus).

Broth.
11.11.20. Large number gram pos. diplococci.

Subculture.
12.11.20. Pure growth Staphylococcus (Albus).

10. F. Pleurisy.

Mic.:- Fair number Epithelial Cells: Amorphous Urates.

Broth.
8.11.20. Fair number gram. pos. diplococci.

Subculture.
9.11.20. Mixed growth Staphylococci and gram pos. diplococci.

Broth.
11.11.20. Large and small gram pos. diplococci, some in chains.

Subculture.
12.12.20. Good many Staphylococci:few Streptococci.

11. F. Pleurisy.

Mic.:- Few Pus Cells. Bacteria.

Broth.
8.11.20. No true organisms present.

Subculture.
9.11.20. Sterile.

Broth.
9.11.20. Fair number gram pos. diplococci.

Subculture.
10.11.20. Good many Staphylococci.

12. M. Cardio Vascular Degeneration.

Mic.:- Few Epithelial Cells: good many Pus Cells: good many R.B.C.: Swarms of Bacteria.

Broth.
9.11.20. Few gram pos. diplococci.

Subculture.
10.11.20. Good many gram neg. Bacilli. (B.Coli). Fair number Streptococci.

Broth.
11.11.20. Good many gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
12.11.20. Good many gram neg. Bacilli (B. Coli): Few Streptococci.

13. M. Chronic Appendicitis.

Mic.:- A few Pus Cells. Few Bacteria.

Broth.
11.11.20. Few gram pos. diplococci.

Subculture.
12.11.20. Good many gram neg. Bacilli (B. Coli): good many Staphylococci.

Broth.
14.11.20. Fair number gram pos. diplococci and gram neg. Bacilli.

Subculture.
15.11.20. Large number gram neg. Bacilli. (B. Coli): Fair number Streptococci.

14./

14. F. Appendicitis.

Mic.:- granular debris.

Broth.
11.11.20. Large numbers gram pos. diplococci.

Subculture.
12.11.20. Large number Streptococcus Mucosus Capsulatus: Few gram neg. Bacilli (B. Coli).

Broth.
14.11.20. Numerous gram pos. cocci.

Subculture. Large growth Staphylococcus (Albus).

15. F. Chronic Appendicitis.

Mic.:- Amorphous Urates.

Broth.
11.11.20. Good number gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
12.11.20. Good many gram neg. Bacilli (B. Coli): Few Staphylococci and Streptococci.

Broth.

14.11.20. Large number gram pos. cocci.

Subculture.
15.11.20. Pure growth Staphylococcus (Albus).

16./

16. F. Splenic Anaemia.

Mic.:- good many Epithelial and Pus cells. Swarms of Bacteria.

Broth.
11.11.20. Fair number gram pos. diplococci: Few gram neg. and pos. Bacilli.

Subculture.
12.11.20. Good many gram neg. Bacilli (B. Coli): Fair number gram pos. diplococci. Few short gram pos. Bacilli.

Broth.
13.11.20. Fair number gram neg. Bacilli.

Subculture.
14.11.20. Extensive pure growth gram neg. Bacilli (B. Coli).

Broth.
18.11.20. Good many gram neg. Bacilli.

Subculture.
19.11.20. Good number gram neg. Bacilli (B. Coli): Few gram pos. diplococci.

17. M. Asthma.

Mic.:- Few Epithelial Cells: some granular debris. Phosphates.

Broth.
12.11.20. Large numbers gram pos. cocci and diplococci.

Subculture.
13.11.20. Extensive growth Staphylococcus Albus.

Broth.
14.11.20. Good many gram pos. diplococci and gram pos. Bacilli.

Subculture.
15.11.20. Mixed growth Staphylococci and streptococci.

18. M. Nephritis.

Mic.:- good many Epithelial and Pus Cells. Few hyaline casts: Bacteria.

Broth.
4.10.20. Good many gram pos. diplococci.

Subculture.
5.10.20. Pure growth gram neg. Bacilli (B. Coli).

19. F. Gastric Ulcer.

Mic.:- Nil.

Broth.
4.10.20. No organisms seen.

Subculture.
5.10.20. Sterile.

20. M. Appendicitis.

Mic.:- A few Epithelial and Pus cells.

Broth.
6.10.20. Few gram neg. Bacilli: Few gram pos. diplococci.

Subculture.
7.10.20. Good many gram neg. Coliform Bacilli: Few gram pos. diplococci.

21. F. T.B. Lung.

Mic.:- Few Pus Cells: granular debris.

Broth.
8.10.20. Numerous gram neg. Bacilli: Few gram pos. diplococci.

Subculture.
9.10.20. Good many gram neg. Bacilli (B. Coli). Few gram pos. diplococci.

22. M. Cardio Vascular Degeneration.

Mic.:- A few Epithelial Cells: Fair number Pus Cells: Few hyaline Casts: Bacteria.

Broth.
15.11.20. Large and small gram pos. diplococci: Few gram pos. Bacilli.

Subculture.
16.11.20. Mixture of gram neg. Coliform Bacilli: Staphylococci and gram pos. Bacilli. (diphtheroid B.)

23. M. Cerebral Haemorrhage.

Mic.:- granular debris.

Broth.
16.11.20. Mixture of gram neg. Bacilli and gram pos. diplococci.

Subculture.
17.11.20. Good many gram neg. Bacilli (B. Coli): and Streptococci.

24. M. Acute Rheumatism.

Mic.:- Few Epithelial and Pus Cells: heavy deposit of urates: Bacteria.

Broth.
16.11.20. Fair number gram pos. cocci and diplococci.

Subculture.
17.11.20. Good many Staphylococci and Streptococci.

25./

25. M. Emphysema.

Mic.:- Deposit of Urates. Bacteria.

Broth.
16.11.20. Large and small gram pos. diplococci.

Subculture.
17.11.20. Good many gram neg. Bacilli (B. Coli). Fair numbers Streptococci.

Broth.
18.11.20. Fair numbers gram pos. diplococci, some in chains.

Subculture.
19.11.20. Large number gram neg. Bacilli (B. Coli) good many Streptococci.

26. F. Banti's Disease.

Mic.:- Nil.

Broth.
18.11.20. Few gram neg. Cocco-bacillary forms: Few gram pos. diplococci and bacilli.

Subculture.
19.11.20. Mixture gram neg. Bacilli (B. Coli) and Streptococci.

Broth.
21.11.20. Large number gram neg. Bacilli, some in cocco-bacillary form.

Subculture.
22.11.20. Mixed growth gram neg. Bacilli (B. Coli) and Diphtheroid Bacilli.

27. M. Pneumonia.

Mic.:- Fair number Epithelial and Pus Cells: Few R.B.C.: some hyaline and granular casts. Swarms of Bacteria.

Broth.
22.11.20. Large numbers gram pos. diplococci. Few gram neg. Bacilli.

Subculture.
23.11.20. Good many gram neg. Bacilli. (B. Coli): Few gram pos. diplococci.

28. F. Splenic Anaemia.

Mic.:- Heavy deposit of Urates: Few Pus Cells.

Broth.
26.11.20. Few gram pos. diplococci.

Subculture.
27.11.20. Pure growth Staphylococcus (Albus)

Broth.
29.11.20. Few gram pos. diplococci and gram pos. Bacilli.

Subculture.
30.11.20. Pure growth Staphylococcus (Aureus).

29. M. Cerebral Haemorrhage.

Mic.:- Fair number Pus Cells and R.B.C.: granular debris.

Broth.
27.11.20. Large number gram pos. diplococci and Bacilli: one or two gram neg. Bacilli.

Subculture.
28.11.20. Staphylococcus Albus 90%: gram neg. Coliform Bacilli 8%. Diphtheroid Bacilli 2%.

30. F. Appendicitis.

Mic.:- Few Epithelial and Pus Cells: one or two R.B.C. Bacteria.

Broth.
27.11.20. Large number gram pos. diplococci.

Subculture.
28.11.20. Pure growth Staphylococcus (Aureus).

Broth.
29.11.30. Fair number gram pos. diplococci: one or two gram pos. Bacilli.

Subculture.
30.11.20. Mixture of Staphylocci and Streptococci.

31. F. Gastric Ulcer.

Mic.:- good many Epithelial Cells: Few Pus Cells: one or two R.B.C.: Bacteria.

Broth.
29.11.20. Few gram pos. diplococci.

Subculture.
30.11.20. Gram neg. Bacilli (B. Coli) 95%: Streptococci 5%.

Broth.
1.12.20. Large number gram pos. cocci and diplococci.

Subculture.
2.12.20. Pure growth Staphylococcus Albus.

32. M. Diabetes.

Mic.:- Few Pus Cells. Bacteria.

Broth.
29.11.20. Large numbers gram pos. diplococci: Few gram pos. Bacilli.

Subculture.
30.11.20. Pure growth Staphylococcus (Albus).

Broth.
1.12.20. Large number gram pos. diplococci, some in chains: few gram pos. Bacilli.

Subculture.
2.12.20. Mixed growth Staphylococci: Streptococci and Enterococci.

33./

33. F. Chronic Appendicitis.

Mic.:- Few Epithelial and Pus Cells: one or two R.B.C.: deposit of urates: Swarms of Bacteria.

Broth.
29.11.20. Good many gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
30.11.20. Gram neg. Bacilli (B. Coli) 98%: Streptococci 2%.

Broth.
1.12.20. Large numbers gram neg. Bacilli.

Subculture.
2.12.20. Gram neg. Bacilli (B. Coli) 60%: Streptococci 40%.

34. M. Pneumonia.

Mic.:- Fair number Epithelial Cells: Few Pus Cells.

Broth.
29.11.20. Large number gram pos. diplococci and gram neg. Bacilli.

Subculture.
30.11.20. Gram neg. Bacilli (B. Coli) 80%: Streptococci 20%.

35. F. Nephritis.

Mic.:- Fair number Epithelial and Pus Cells: Few R.B.C.: granular Casts and debris: Bacteria.

Broth.
29.11.20. Few gram pos. Cocci and diplococci.

Subculture.
30.11.20. Pure growth Staphylococcus (Albus).

Broth.
1.12.20. No true organisms seen.

Subculture.
2.12.20. Sterile.

36. F. Rheumatoid Arthritis.

Mic.:- granular debris.

Broth.
30.11.20. No true organisms seen.

Subculture.
1.12.20. Sterile.

Broth.
2.12.20. Few gram pos. diplococci and gram neg. Bacilli.

Subculture.
3.12.20. Fair numbers gram pos. diplococci and gram neg. Coliform Bacilli.

37. M. Pneumonia.

Mic.:- Few Epithelial and Pus Cells: Few R.B.C.: deposit of Urates: Bacteria.

Broth.
30.11.20. Large number gram pos. diplococci.

Subculture.
1.11.20. Pure growth Staphylococcus (Albus).

Broth.
2.11.20. Large number gram pos. cocci and diplococci.

Subculture.
3.11.20. Pure growth Staphylococcus (Albus).

38./

38. M. Nephritis.

Mic.:- Few Epithelial Cells: Large number of Pus Cells and R.B.C.: Bacteria.

Broth.
1.12.20. Few gram pos. diplococci and gram neg. Bacilli.

Subculture.
2.12.20. Gram neg. Bacilli (B. Coli) 80%: gram pos. diplococci 20%.

Broth.
3.12.20. Few gram pos. diplococci and gram neg. Bacilli.

Subculture.
4.12.20. Gram neg. Bacilli (B. Coli) 70%: gram pos. diplococci 30%.

39. M. Cardio Vascular Degeneration.

Mic.:- Few Pus cells and R.B.C.: Bacteria.

Broth.
1.12.20. Large number gram pos. diplococci.

Subculture.
2.12.20. Mixture of Staphylococci and Streptococci.

Broth.
6.12.20. Numerous chains of gram pos. diplococci.

Subculture.
7.12.20. Streptococci 95%: gram neg. Coliform Bacilli 5%.

40. M. Cardiac Disease.

Mic.:- Few Epithelial and Pus Cells: Few R.B.C.: Bacteria.

Broth.
3.12.20. Few gram pos. diplococci.

Subculture.
4.12.20. Pure growth Staphylococcus Albus.

Broth.
4.12.20. Few gram pos. diplococci and gram pos. Bacilli.

Subculture. Large number Staphylococci and Entero-
5.12.20. cocci.

41. F. Myxoedema.

Mic.:- deposit of Urates and Ca. Ox. Crystals.

Broth.
3.12.20. Large number gram pos. diplococci.

Subculture.
4.12.20. Pure growth Staphylococcus (Albus).

Broth.
5.12.20. Fair number gram pos. diplococci.

Subculture.
6.12.20. Pure growth Staphylococcus (Albus).

42. M. Cardiac Disease.

Mic.:- Few Epithelial Cells: Fair number Pus Cells: deposit of Urates: Bacteria.

Broth.
4.12.20. Large number gram pos. cocci and diplococci.

Subculture.
5.12.20. Pure growth Staphylococcus (Albus).

Broth.
6.12.20. Few gram pos. cocci and diplococci.

Subculture.
7.12.20. Gram neg. Coliform Bacilli 60%: Staphylococci 40%.

43./

43. M. Carcinoma of Stomach.

Mic.:- Deposit of Urates: Large number Ca. Ox. Crystals.

Broth.
6.12.20. Large number gram pos. cocci.

Subculture.
7.12.20. Pure growth Staphylococcus (Albus).

Broth.
8.12.20. Large and small gram pos. diplococci.

Subculture.
9.12.20. Pure growth Staphylococcus (Albus).

44. M. Mitral Stenosis.

Mic.:- Nil.

Broth.
6.12.20. Large number gram pos. cocci.

Subculture.
7.12.20. Pure growth Staphylococcus (Aureus)

Broth.
8.12.20. Large number gram pos. cocci: few chains of gram pos. diplococci.

Subculture.
9.12.20. Mixed growth Staphylococci and Streptococci.

45./

45. F. Rheumatism.

Mic.:- Heavy deposit of Urates: slight amount of debris. Bacteria.

Broth.
6.12.20. Few gram pos. diplococci.

Subculture.
7.12.20. Staphylococci 60%: Streptococci 40%

Broth.
8.12.20. Good many gram neg. Bacilli: few gram pos. cocci.

Subculture.
9.12.20. Gram neg. Bacilli (B. Coli) 95%: Streptococci 5%.

46. F. Auricular Fibrillation.

Mic.:- Few Pus Cells: Fair number R.B.C.: heavy deposit of urates.

Broth.
8.12.20. Large number gram neg. Bacilli: Fair number gram pos. cocci.

Subculture.
9.12.20. Gram neg. Bacilli (B. Coli) 95%: gram pos. Bacilli 5%.

Broth.
10.12.20. Large number gram neg. Bacilli.

Subculture.
11.12.20. Gram neg. Bacilli (B. Coli) 95% gram pos. diplococci 5%.

47. M. Jaundice.

Mic.:- Few Epithelial and Pus Cells: hyaline cast. Bacteria.

Broth.
6.12.20. Large number gram pos. cocci.

Subculture.
7.12.20. Pure growth gram neg. Coliform Bacilli.

48. M. Epilepsy.

Mic.:- Large number Pus Cells: Fair number Epithelial Cells: Fair number Bacteria.

Broth.
11.12.20. Fair number gram neg. Bacilli: large number gram pos. diplococci.

Subculture.
12.12.20. Extensive growth gram neg. Bacilli (B. Coli): Fair numbers gram pos. diplococci.

Broth.
13.12.20. Large number gram pos. diplococci: Fair numbers gram neg. Bacilli.

Subculture.
14.12.20. Large number gram neg. Bacilli (B. Coli): Large numbers Staphylococci.

49. M. Nephritis.

Mic.:- Few Epithelial Cells: Few Pus Cells: one or two pieces of hyaline casts: Fair number R.B.C.: Few Bacteria.

Broth.
13.12.20. Good many large gram pos. cocci.

Subculture.
14.12.20. Pure growth Staphylococcus Albus.

50. M. T.B. Lung.

Mic.:- Urates and large number Ca. Ox. Crystals.

Broth.
13.12.20. Large number gram pos. diplococci.

Subculture.
14.12.20. Gram neg.B.(B. Coli) 60%: Staphylococci 40%.

51./

51. F. Nephritis.

Mic.:- Fair number of Pus and Epithelial Cells: Few R.B.C.: slight amount of debris and granular casts.

Broth.
10.12.20. Sterile.

Subculture.
11.12.20. Sterile.

52. F. Prolapsus Uteri.

Mic.:- Urates. Swarms of Bacteria.

Broth.
8.12.20. Fair numbers gram neg. Bacilli. Few gram pos. Bacilli.

Subculture.
9.12.20. Pure growth gram neg. Bacilli (B. Coli).

Broth.
10.12.20. Fair numbers gram neg. Bacilli. Few gram pos. cocci and Bacilli.

Subculture.
11.12.20. Gram neg. B. (B. Coli) 85%: gram pos. diplococci 15%.

53. F. Gastric Ulcer.

Mic.:- Few Epithelial Cells: Few Pus Cells: One or two R.B.C.: Few Bacteria.

Broth.
24.12.20. Large number of gram pos. cocci.

Subculture.
25.12.20. Staphylococci 95%: gram neg. B. (B. Coli) 5%.

54./

54. F. Chorea.

Alkaline Urine.

Mic.:- Few Epithelial Cells: one or two Pus Cells: one or two R.B.C.: Fair number triple Phosphates.

Broth.
24.12.20. Fair number large gram pos. cocci and diplococci.

Subculture.
25.12.20. Gram neg. Coliform Bacilli 75%: Staphylococci 25%.

55. M. Duodenal Ulcer.

Mic.:- Few Epithelial Cells: Fair number Pus Cells: slight amount of debris: Few Bacteria.

Broth.
20.12.20. Good many gram pos. diplococci.

Subculture.
21.12.20. Streptococci and gram pos. diplococci 95%: gram neg. Bacilli (B. Coli) 5%.

56. M. Cardiac Disease.

Mic.:- Fair number Epithelial Cells: One or two Pus Cells. Few Bacteria.

Broth.
21.12.20. Large number gram pos. diplococci.

Subculture.
22.12.20. Staphylococci 95%: Gram neg. Coliform Bacilli 5%.

57./

57. M. Chronic Constipation.

Mic.:- Fair number Pus Cells: one or two R.B.C.: Few Bacteria.

Broth.
23.12.20. Fair numbers gram pos. diplococci, some in chains.

Subculture.
24.12.20. Staphylococci (Albus) 90%: Streptococci 40%.

58. M. Pneumonia.

Mic.:- Few Epithelial Cells: Fair numbers Bacteria.

Broth.
23.12.20. Fair numbers gram pos. diplococci: good number gram neg. Bacilli.

Subculture.
24.12.20. Gram neg. Coliform Bacilli 60%: Staphylococci 40%.

59. M. Nephritis.

Mic.:- Good many Epithelial Cells: Large number Pus Cells: Fair number R.B.C.: Large number hyaline Casts.

Broth.
30.10.20. Fair number large gram pos. diplococci: some chains of small diplococci.

Subculture.
1.11.20. Fair number Staphylococci: Few Streptococci.

Broth.
18.11.20. Large number gram pos. diplococci.

Subculture.
20.11.20. Pure growth Staphylococcus Albus.

60./

60. M. Pyelitis.

Mic.:- Few Epithelial and Pus Cells: Fair amount of debris: Bacteria.

Broth.
23.9.20. Fair number gram pos. diplococci.

Subculture.
24.9.20. Staphylococcus Albus and Aureus.

61. F. Nephritis.

Mic.:- Large number Epithelial and Pus Cells: good many hyaline and granular Casts: Few R.B.C.: Fair amount debris: Bacteria.

Broth.
28.9.20. Very few gram pos. cocci.

Subculture.
29.9.20. Pure growth Staphylococcus (Albus)

Broth.
2.10.20. No true organisms seen.

Subculture.
3.10.20. Sterile.

62. F. Pyelitis.

Mic.:- Good many Epithelial Cells: Large number Pus Cells: Bacteria.

Broth.
28.9.20. Large number gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
29.9.20. Fair number gram neg. Bacilli (B. Coli) and gram pos. diplococci.

Broth.
2.10.20. Fair number gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
3.10.20. Large number gram neg. Bacilli (B. Coli). Fair number gram pos. diplococci.

63. M. Disseminated Sclerosis.

Mic.:- Few Epithelial and Pus Cells. Few Ca. Ox. Crystals.

Broth.
7.10.20. Few gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
8.10.20. Gram neg. B. (B.Coli) and few Streptococci.

Broth.
8.10.20. Fair number gram neg. Bacilli.

Subculture.
9.10.20. Pure growth gram neg. Bacilli (B.Coli).

64. F. Cardiac disease.

Mic.:- Good many Epithelial Cells: Fair number Pus Cells: good many R.B.C.: Swarms of Bacilli.

Broth.
8.10.20. No organisms seen.

Subculture.
9.10.20. Sterile.

Broth.
11.10.20. No organisms seen.

Subculture.
12.10.20. Sterile.

65. M. Empyema.

Mic.:- Few Epithelial Cells: Large number Pus Cells: one or two R.B.C.: Swarms of Bacteria.

Broth.
8.10.20. Few gram neg. Bacilli: Few gram pos. diplococci.

Subculture.
9.10.20. Fair number gram neg. B. (B. Coli): Few Streptococci.

Broth.
11.10.20. Few gram neg. Bacilli: Few gram pos. diplococci.

Subculture.
12.10.20. Extensive growth gram neg. Bacilli (B. Coli): Few Streptococci.

66. F. Dyspepsia.

Mic.:- Few Epithelial and Pus Cells: Bacteria.

Broth.
11.10.20. Few gram pos. diplococci.

Subculture.
12.10.20. Extensive growth of gram neg. Bacilli (B. Coli): Few gram pos. diplococci.

67. M. Myocarditis.

Mic.:- Few Epithelial and Pus Cells: Large number Ca. Ox. Crystals.

Broth.
11.10.20. Few gram pos. diplococci.

Subculture.
12.10.20. Pure growth Staphylococcus Aureus.

68. M. Asthma.

Mic.:- Few Epithelial Cells. Few Bacteria.

Broth.
14.10.20. Very few gram pos. diplococci.

Subculture.
15.10.20. Pure growth gram neg. Bacilli.

Broth.
17.10.20. Few gram pos. diplococci: few gram neg. Bacilli.

Subculture.
18.10.20. Good many gram neg. Bacilli (B.Morgan I): Few Staphylococci.

Broth.
11.11.20. Large number gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
12.11.20. Good many gram neg. Bacilli (B.Morgan I) Few gram pos. Bacilli.

69. F. Cardiac Disease.

Mic.:- Few Epithelial and Pus Cells. Slight amount of debris.

Broth.
14.10.20. Few gram pos. diplococci.

Subculture.
15.10.20. Pure growth Staphylococcus Albus.

Broth.
17.10.20. Few gram pos. diplococci:
Few gram neg. Bacilli.

Subculture.
18.10.20. Few gram neg. Bacilli (B. Coli):
Few gram pos. diplococci.

70. M. Neurasthenia.

Mic.:- Good many Epithelial Cells: Few Pus Cells: one or two R.B.C.: Few Bacteria.

Broth.
17.10.20. Few gram neg. Bacilli.

Subculture.
18.10.20. Few gram neg. Bacilli (B. Coli):
Few Staphylococci.

Broth.
18.10.20. Few gram pos. diplococci.

Subculture.
19.10.20. Few gram neg. Bacilli (B. Coli):
Few gram pos. diplococci.

71. F. Rheumatoid Arthritis.

Mic.:-Fair number Epithelial Cells: one or two Pus Cells. Piece of hyaline Cast. Few Bacteria.

Broth.
16.10.20. Fair number gram pos. diplococci.

Subculture.
17.10.20. Pure growth Staphylococcus (Albus).

72. F. Acute Rheumatism.

Mic.:- Good many Epithelial Cells: one or two Pus Cells. Many R.B.C.: Large number Uric Acid Crystals.

Broth.
18.10.20. Good many large gram pos. cocci.

Subculture
19.10.20. Few gram pos. diplococci: Few gram neg. Bacilli (B. Coli).

73. M. Chronic Appendicitis.

Mic.:- Nil.

Broth.
18.10.20. Fair number gram pos. diplococci.

Subculture.
19.10.20. Pure growth Staphylococcus (Albus).

Broth. Good many gram pos. diplococci:
21.10.20. good many gram neg. Bacilli.

Subculture. Good many gram neg. B. (B. Coli):
22.10.20. Few Staphylococci and Streptococci.

74. M. Pneumonia.

Mic.:- Few Epithelial and Pus Cells: Few hyaline and granular casts: good deal debris: Bacteria.

Broth. Large number gram neg. Bacilli:
18.10.20. Few gram pos. diplococci.

Subculture. Good many gram neg. B. (B. Coli):
19.10.20. Few gram pos. diplococci.

75. M. Rheumatism.

Mic.:- Fair number Epithelial Cells: great number Pus Cells. Few Bacteria.

Broth.
19.10.20. Few gram pos. diplococci, some in chains.

Subculture. Fair no. gram neg. Coliform Bacilli:
20.10.20. Fair no. Streptococci: Few Staphylococci (Tetrads)

76. F. Colitis.

Mic.:- Fair number Pus Cells.
Bacteria.

Broth.
23.10.20. Few gram pos. diplococci.

Subculture.
24.10.20. Pure growth Staphylococcus (Aureus).

Broth.
26.10.20. Large number gram pos. diplococci.

Subculture.
27.10.20. Good many gram pos. diplococci and Streptococci.

77. M. Secondary Anaemia.

Mic.:- Fair amount of debris and few Pus Cells.

Broth.
25.10.20. Few gram neg. Bacilli: good many gram pos. diplococci.

Subculture. Good many gram neg. Bacilli (B. Coli)
26.10.20. and gram pos. diplococci.

Broth. Few chains of gram pos. diplococci:
23.12.20. good many gram neg. Bacilli: good many gram pos. cocci.

Subculture. Gram neg. B. (B. Coli) 70%: Staphylococci
24.12.20. 25%: Streptococci 5%.

78. F. Uraemia.

Mic.:- Few Epithelial and Pus Cells: Few Casts: good deal of debris and Bacteria.

Broth.
25.10.20. Good many gram neg. Bacilli.

Subculture. Good many gram neg. B. (B. Coli) and
26.10.20. gram pos. diplococci.

Broth. Fair number gram pos. diplococci:
27.10.20. very few gram neg. Bacilli.

Subculture. Mixed growth of Staphylococci and gram
28.10.20. pos. diplococci.

79. M. Neurasthenia.

Mic.:- Few Epithelial and Pus Cells.

Broth.
25.10.20. Fair number gram pos. diplococci and gram neg. Bacilli.

Subculture.
26.10.20. Pure growth gram neg. Bacilli (B. Coli).

Broth.
8.11.20. Few gram pos. diplococci.

Subculture.
9.11.20. Pure growth Staphylococcus (Albus).

80. M. Ulcerative Colitis.

Mic.:- Few Pus Cells. Bacteria.

Broth.
25.10.20. Fair number gram pos. diplococci.

Subculture. Few gram neg. Coliform Bacilli:
26.10.20. Fair number Staphylococci & Streptococci.

81. M. Lumbago.

Mic.:- Nil.

Broth.
26.10.20. Few gram pos. diplococci.

Subculture. Fair number gram neg. Bacilli (B. Coli):
27.10.20. Few Staphylococci.

82. M. Peripheral Neuritis.

Mic.:- Few Pus and Epithelial Cells.

Broth.
30.10.20. Few gram pos. cocci.

Subculture. Good many gram neg. B. (B. Coli)
1.11.20. predominating over Staphylococci.

Broth.
3.11.20. Large numbers gram pos. diplococci.

Subculture. Mixed growth gram neg. Coliform Bacilli
4.11.20. and Streptococci.

83. M. Epilepsy.

Mic.:- Urates and few Ca. Ox. Crystals.

Broth.
3.10.20. Fair numbers large and small gram pos. cocci.

Subculture.
1.11.20. Mixed growth Staphylococci and Streptococci.

Broth.
2.11.20. Large number gram pos. cocci and diplococci.

Subculture.
3.11.20. Pure growth Staphylococci.

84. M. Hyperthyroidism.

Mic.:- One or two Pus and Epithelial Cells, granular debris and Bacteria.

Broth.
30.10.20. Few gram pos. diplococci, some in chains.

Subculture.
1.11.20. Mixed growth Staphylococci and Streptococci.

85. M. Cardiac Disease.

Mic.:- One or two Epithelial cells: slight amount of debris.

Broth.
1.11.20. Large number gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
2.11.20. Fair number gram neg. B. (B. Coli): Few Staphylococci and Streptococci.

Broth.
3.11.20. Fair number gram pos. diplococci.

Subculture.
4.11.20. Good number gram neg. Bacilli (B. Coli): Fair number Streptococci.

86. M. Rheumatoid Arthritis.

Mic.:- Few Epithelial Cells. Fair number Pus Cells. Few granular and hyaline Casts.

Broth.
1.11.20. Good number gram pos. diplococci, some in chains: Few gram neg. Bacilli.

Subculture.
2.11.20. Good number gram neg. B. (B. Coli): Fair number Staphylococci & Streptococci.

Broth.
4.11.20. Large number gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
5.11.20. Good many gram neg. Bacilli (B. Coli) and Streptococci.

87. M. Cerebral Haemorrhage.

Mic.:- Few Epithelial and Pus Cells: Few R.B.C.: slight amount debris: Bacteria.

Broth.
1.11.20. Large number gram pos. diplococci: numerous gram neg. cocco-Bacillary form.

Subculture. Mixed growth gram neg. B. (B. Coli)
2.11.20. and Streptococci.

Broth. Large number gram pos. diplococci:
4.11.20. and gram neg. Bacilli.

Subculture. Good many gram neg. B. (B. Coli):
5.11.20. Few Streptococci.

88. M. Pleurisy and Effusion.

Mic.:- Amorphous urates.

Broth.
2.11.20. Large no. gram pos. cocci & diplococci.

Subculture. Mixed growth Staphylococci, Streptococci
3.11.20. and gram pos. diplococci.

Broth.
5.11.20. Few gram pos. diplococci.

Subculture. Large no. gram neg. Bacilli (B.Coli) and
6.11.20. Streptococci.

89. F. Exophthalmic Goitre.

Mic.:- Few Epithelial Cells: good many Pus Cells: one or two R.B.C.: and Ca. Ox. Crystals. Bacteria.

Broth.
1.11.20. No true organisms seen.

Subculture.
2.11.20. Sterile.

Broth.
3.11.20. Large number gram pos. diplococci.

Subculture.
4.11.20. Large number Staphylococci: Fair number Streptococci.

90. F. Diabetes.

Mic.:- Numerous Ca. Ox. Crystals.

Broth.
4.11.20. Good many large and small gram pos. diplococci.

Subculture.
5.11.20. Fair number small gram pos. diplococci and streptococci: good many Staphylococci.

Broth.
7.11.20 Fair number large gram pos. cocci.

Subculture. Fair number Staphylococci & Streptococci:
8.11.20. Few small gram pos. diplococci.

91. F. Cardiac disease.

Mic.:- Fair number Epithelial and Pus Cells: good deal of debris: good many R.B.C.: Swarms Bacteria.

Broth.
4.11.20. Few gram pos. diplococci.

Subculture.
5.11.20. Pure growth Staphylococcus (Albus).

Broth.
6.11.20. Few small and large gram pos. diplococci.

Subculture. Mixed growth Staphylococci and gram pos.
7.11.20. diplococci.

92. F. Gall Stones.

Mic.:- Good many Epithelial and Pus Cells: Few R.B.C.: some debris and granular Casts.

Broth.
4.11.20. Small and large gram pos. diplococci.

Subculture.
5.11.20. Mixed growth of Staphylococci and Streptococci.

Broth.
7.11.20. Small and large gram pos. diplococci.

Subculture.
8.11.20. Mixed growth of Staphylococci and Streptococci.

93. F. Rheumatoid Arthritis.

Mic.:- Few Epithelial Cells: good many Pus Cells: one or two R.B.C.: Few Ca. Ox. Crystals.

Broth.
4.11.20. Few gram pos. diplococci.

Subculture.
5.11.20. Few Streptococci and gram pos. diplococci: good many Staphylococci.

Broth.
7.11.20. Good many large gram pos. cocci.

Subculture.
8.11.20. Mixture of Staphylococci and gram pos. diplococci.

94. M. Gastric Ulcer.

Mic.:- Few Epithelial Cells: Fair number Pus Cells: one or two R.B.C.: Uric acid and Ca. Ox. Crystals: Bacteria.

Broth. Large number gram pos. diplococci:
29.12.20. good many gram neg. Bacilli.

Subculture. Staphylococci and Streptococci 60%:
30.12.20. gram neg. Bacilli (B. Coli) 40%.

95. M. Pneumonia.

Mic.:- Good number Epithelial Cells. Few Pus Cells: one or two R.B.C. Fair amount urates and debris: Bacteria.

Broth.
29.12.20. Large number gram pos. diplococci and cocci.

Subculture.
30.12.20. Pure growth Staphylococcus (Albus).

96. F. Rheumatism.

Mic.:- Few Epithelial and Pus Cells: Bacteria.

Broth.
27.12.20. Good many gram pos. diplococci: Good many gram neg. bacilli.

Subculture.
28.12.20. Gram neg. Bacilli (B. Coli) 90%: Staphylococci 10%.

Broth.
29.12.20. Fair number of gram pos. diplococci.

Subculture. Gram neg. Bacilli (B. Coli) 60%:
30.12.20. Streptococci 40%.

97. M. Locomotor Ataxia.

Mic.:- Few Pus and Epithelial Cells.

Broth.
4.1.21. Few gram pos. diplococci and gram pos. Bacilli.

Subculture.
5.1.21. Pure growth Staphylococcus (Albus).

98. M. Colitis.

Mic.:- Fair number Pus Cells: good deal of debris.

Broth. Large number gram pos. diplococci:
4.1.20. Few gram neg. Bacilli.

Subculture. Gram neg. Bacilli (B. Coli) 80%:
5.1.20. Streptococci 20%.

99. M. Acute Leukaemia.

Mic.:- Urates entirely.

Broth.
11.1.21. Large number gram pos. diplococci: Few gram neg. Bacilli.

Subculture.
12.1.21 Gram neg. Bacilli (B. Coli) 80%: Streptococci 20%.

Broth.
18.1.21. Fair number gram pos. diplococci and gram pos. Bacilli. Few gram neg. Bacilli.

Subculture.
19.1.21. Gram neg. Bacilli (B. Coli) 65%: Streptococci 30%: Diphtheroid B. 5%.

100. M. Cardio Vascular Degeneration.

Mic.:- Few Epithelial and Pus Cells: Bacteria.

Broth.
11.1.21. Large number gram pos. diplococci.

Subculture.
12.1.21. Gram neg. Bacilli (B. Coli) 60%: Staphylococci 40%.

101. F. Neurasthenia.

Mic.:- Fair number Epithelial and Pus Cells. Bacteria.

Broth.
16.1.21. Fair number gram pos. diplococci.

Subculture.
17.1.21. Large gram pos. diplococci 60%: gram neg. Bacilli (B. Coli) 40%.

102./

102. F. Carcinoma of Stomach.

Mic.:- Fair number of Pus Cells. Bacteria.

Broth.
16.1.21. Large number gram pos. diplococci: one or two gram neg. Bacilli.

Subculture.
17.1.21. Gram neg. Bacilli (B. Coli) 75%: Streptococci 25%.

103. M. Pneumonia.

Mic.:- One or two Pus Cells: Ca. Ox. Crystals. Bacteria.

Broth.
18.1.21. Large number gram pos. diplococci: Fair number gram neg. Bacilli.

Subculture.
19.1.21. Gram neg. Bacilli (B. Coli) 90%: Staphylococci 10%.

104. M. Hemiplegia.

Mic.:- Few Epithelial and Pus Cells: Urates: Very large no. Ca. Ox. Crystals. Bacteria.

Broth.
19.1.21. Good many gram pos. diplococci.

Subculture
20.1.21. Gram neg. Bacilli (B. Coli) 95%. Streptococci 5%.

105. M. Pneumonia.

Mic.:- Few Pus Cells and R.B.C: Few pieces of hyaline and granular Casts. Swarms of Bacteria.

Broth.
19.1.21. Large number gram pos. diplococci: one or two gram neg. Bacilli.

Subculture.
20.1.21. Gram neg. Bacilli (B. Coli) 70%: Staphylococci 30%.

Case.	Glucose.	Lactose.	Maltose.	Saccharose.	Dulcite.	Mannite.	Imulin.	Salicin.	Gelatin.	Litmus Milk.	Indol.	Motility.
5.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
12.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
13.	A	A&G	A&G	A&G	-	-	-	A&G	-	A & Clot	+	+
14.	A&G	A&G	-	-	-	A&G	-	-	-	A & Clot	+	+
15.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
16.	A&G	A&G	A&G	-	A&G	A&G	-	A	-	A & Clot	+	+
21.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
23.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
25.	A&G	A&G	A	A&G	-	-	-	A&G	-	A & Clot	+	+
26.	A&G	A&G	A&G	-	-	A&G	-	-	-	A & Clot	+	+
27.	A&G	A&G	A&G	A&G	-	-	-	-	-	A & Clot	+	+
31.	-	A&G	-	A	-	A&G	-	A	-	A & Clot	+	+
33.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
34.	A&G	A&G	A&G	A&G	-	A&G	-	A&G	-	A & Clot	+	+
38.	A&G	A&G	A&G	A&G	-	A&G	-	A	-	A & Clot	+	+
39.	A	A	A	A	-	-	-	A	-	A & Clot	+	+

Case.	Glucose.	Lactose.	Maltose.	Saccharose.	Dulcite.	Mannite.	Inulin.	Salicin.	Gelatin.	Litmus Milk.	Indol.	Motility.
42.	A	A	A	A	-	A	-	A	-	A & Clot	+	+
45.	A&G	A&G	-	A&G	-	A	A	A&G	-	A & Clot	+	+
46.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
47.	A	A	A	A	-	A	-	A	-	A & Clot	+	+
48.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
50.	A&G	A&G	A&G	A&G	-	A&G	A	-	-	A & Clot	+	+
94.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
52.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
56.	A	-	A&G	A&G	-	A	-	-	-	A & Clot	+	+
54.	A	A	A	A	-	-	-	A	-	A & Clot	+	+
58.	A&G	-	-	A&G	-	A	-	A	-	A & Clot	+	+
62.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
68.	A&G	-	A&G	A&G	-	-	-	A&G	-	A & Clot	+	+ B.Morgan I.
68.	A&G	-	A&G	A&G	-	-	-	A&G	-	A & Clot	+	+ B.Morgan I.
69.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
70.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+

Case.	Glucose.	Lactose.	Maltose.	Saccharose.	Dulcite.	Mannite.	Inulin.	Salicin.	Gelatin.	Litmus Milk.	Indol.	Motility.
73.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
74.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
75.	A&G	-	-	A&G	-	A&G	-	-	-	A	+	+
77.	-	A&G	A&G	A&G	-	-	-	-	-	A & Clot	+	+
78.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
79.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
80.	A&G	-	A&G	A&G	-	A&G	-	A&G	-	A & Clot	+	+
81.	A&G	A&G	A&G	A&G	-	A&G	-	A	-	A & Clot	+	+
82.	A&G	-	A&G	A&G	-	-	-	A&G	-	A & Clot	+	+
85.	A&G	A&G	-	A&G	-	-	-	A&G	-	A & Clot	+	+
86.	A&G	A&G	A&G	A&G	-	-	-	-	-	A & Clot	+	+
87.	-	A&G	-	-	-	A&G	-	-	-	A & Clot	+	+
88.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
96.	A&G	A&G	A&G	A&G	A&G	A&G	-	-	-	A & Clot	+	+
98.	A&G	A	A&G	A&G	-	A	-	A&G	-	A & Clot	+	+
99.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+

Case.	Glucose.	Lactose.	Maltose.	Saccharose.	Dulcite.	Mannite.	Inulin.	Salicin.	Gelatin.	Litmus Milk.	Indol.	Motility.
100.	A&G	A&G	A&G	A&G	-	-	-	A&G	-	A & Clot	+	+
101.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
102.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
103.	A&G	A&G	A&G	A&G	A&G	A&G	-	A	-	A & Clot	+	+
104.	A&G	A&G	A&G	A&G	A&G	A&G	-	-	-	A & Clot	+	+
105.	A&G	A&G	A&G	A&G	-	A&G	-	A&G	-	A & Clot	+	+

I. Dr Panton's Cases. 100 cases. Urine free from Pus & Albumin.

Sterile . . .	18%
Coliform bacilli .	7%
Staphylococci .	55%
Enterococci . .	10%
B. Proteus . .	10%

II. Tabulated Result of examination of 105 cases.

Sterile	6 times . .	5.7%
Coliform bacilli	4 times . .	3.8%
Staphylococci (Staph.Aureus 4 times)	26 times . .	24.8%
B.Coli & gram pos. diplococci . .	16 times . .	15.2%
B.Coli & Streptococci . . .	16 times . .	15.2%
B.Coli & Staphylococci . . .	12 times . .	11.4%
Staphylococci & Streptococci . .	7 times . .	6.7%
B.Coli, Staphylococci & Streptococci	6 times . .	5.7%
Staphylococci, Streptococci & gram positive diplococci . . .	3 times . .	2.9%
B.Coli, Staphylococci, & diphtheroid bacilli	Twice . .	1.9%
Staphylococci & Gram pos. diplococci B.Coli, Streptococci & gram pos. diplococci Staphylococci & Diphtheroid bacilli B. Pyocyaneus. B.Coli, gram pos. diplococci & bacilli B.Coli & Diphtheroid bacilli. B.Morgan I.	Once each. .	0.95%

In the appended table a resumé of the organisms encountered is given. The comparative table which is added are Panton's results of a similar investigation and is taken from Kidd's monograph. It is evident that a bacteriuria is of even greater frequency than Panton's investigation indicates. It will be seen that the urines which are sterile when carefully examined are thus very few; - 18% in Panton's series, 5.7% in my series. Kidd has pointed out that one may obtain sterile specimens especially when the specimen is a catheter one. He has suggested that the formalin used to sterilise the catheter inhibits growth. In this connection it is not without interest that all the urines in my series, which I found to be sterile, were all from female patients in all of whom a catheter specimen was of course examined.

It is well known that even in acute kidney infection a sterile specimen may occasionally be obtained. This is due to the fact that if one kidney only is affected the ureter may become choked with inflammatory debris, and urine only passes down the healthy patent ureter. While neither of these statements can explain wholly the sterile urines, one must admit with Kidd that a sterile urine is a comparative rarity.

In Panton's series there is not a single instance in which a streptococcus was found either alone or in conjunction with another organism. It will be seen from the table that organisms presumably of the Streptococcal/

Streptococcal type were frequently present. They occurred usually in conjunction with other organisms. Coliform bacilli, as it is to be expected, were found frequently, though only four times in pure culture. The biochemical reactions showed that in a definite number of cases the gram negative bacilli gave typical reactions of Colon bacillus.

The biochemical reactions were performed as follows:- A typical, isolated red colony of bacillus coli, on the MacConkey's medium was carefully taken off the medium by a platinum needle, and smeared on to an Agar slope, which was then incubated for twenty four hours at 37° Centigrade. From the growth so obtained, the various sugars, peptone water, litmus milk, and gelatine were inoculated. The sugars used were Glucose, Lactose, Maltose, Saccharose, Dulcite, Mannite, Inulin and Salicin. The results were indicated as follows:-

A & G = Acid and Gas produced from the sugars.

\- indicates no change in sugars and no liquifaction of gelatine.

\+ indicates the production of Indol from the peptone water, and also signifies that the organisms were motile.

There were eleven cases in which the reactions were atypical. These were cases 39, 42, 47, 54, 56, 58, 68, 75, 80, 82 and 98. In case 68 - a case of Asthma - one found on repeated examination a gram negative bacillus which gave the biochemical reactions for bacillus Morgan I.

In the other ten cases all the organisms were gram negative. Some were in cocco-bacillary form, and in others the organisms were swollen and mis-shapen. The atypical reaction lies chiefly in the fact that the reaction to Lactose was not the usual one. In some cases acid only was produced, in others no result at all was obtained, however, in every case Indol was produced from the peptone water; the gelatine was not liquified; the organisms were motile; and with a single exception of case 75, acute Rheumatism, acid and clot was produced in every case from the Litmus milk. In case 75 acid only was produced and this after three days incubation.

These anomalies in reaction may quite possibly be accounted for by the variations in shape and size of the gram negative organisms which one encountered. The most frequent result that one obtained, and which is typical of the Colon bacillus, was one that produced Acid and Gas from Glucose, Lactose, Maltose, Saccharose; was negative to Dulcite, and produced Acid and Gas from Mannite. Indol was produced from the peptone water; the gelatine was not liquified. Acid and Clot was produced from the Litmus milk and the organism/

organism was motile. There were other typical reactions in which Acid and Gas was produced from Dulcite, and in some too from Salicin, of these extra reactions the former is the more common. Another of the explanations of the atypical biochemical reactions may be, that the character of the organism has been modified or changed by the effect of the other organisms which were present. It is difficult to assess the influence that for instance a Streptococcal infection may have in modifying the character of the Colon bacillus.

The Colon bacillus is usually diagnosed by its power of fermenting Lactose. Too much reliance ought not to be placed upon this alone; for it is well known that this property can be removed at will in the laboratory. It is probable too, that the organisms may undergo some change in the body so that they lose their property of fermenting Lactose.

It is interesting to record the not infrequent differences in the findings of the broth cultures and in the subcultures. This was observed in thirty four cases of the series. On occasion one sees in the film made from the broth culture only gram positive organisms, and obtains on Subculture both gram positive and gram negative organisms. The reverse also obtains, sometimes one finds both types of/

of organism in the broth culture and the subsequent Subculture yields a pure growth of one or other type.

It is possible that these represent variations in staining affinities. One can, by repeated subculture and variation of the acidity of the nutrient medium cause organisms to change the characteristic staining affinity, thus the gram positive Staphylococcus can be made to become gram negative and still retain the other characteristics of the Staphylococcus. By reversing the process the original gram positive organism can be cultivated.

It is possible that varying factors in the body may have a similar effect on the organism; change and variations in acidity and nutrition of the organisms in the bowel may account for the differences recorded. This explanation may account for the anomalous biochemical reactions in cases 39, 42, 47, 56, 75, 80, and 82. It will be seen that in these cases the film from the broth yielded only gram positive organisms, but on Subculture one obtained both gram positive and gram negative organisms. It is possible that the same subtle change which modified the staining characteristics of the organisms may modify in some way the gram negative organisms so that they lose their power of fermenting Lactose. The possibility of this occurring in the body has already been mentioned.

The/

The Staphylococci, Streptococci, gram positive bacilli (diphtheroid bacilli) and gram positive diplococci were found fairly frequently. Only the Staphylococcus was found in pure culture, - 24.8% of cases. In four of the cases Staphylococcus Aureus was found. Kidd has pointed out that "infection with Staphylococcus Aureus gives rise to perinephric abscess; and in these cases the urine is free from pus and bacteria. This is not an uncommon occurrence." In none of the cases in which I found the Staphylococcus Aureus was there any sign of this lesion; but the possibility of it occurring from this source should be considered.

The diphtheroid bacilli were found sometimes associated with the Colon bacillus; sometimes with a Staphylococcus; sometimes in conjunction with both. At other times in conjunction with Streptococci and Colon bacilli. These organisms have been the cause of much controversy and many clinical manifestations have been associated with them, none of which are however very conclusive.

The bacillus Pyocyaneus was found once. This organism is frequently found in the intestine. In the present instance it was found in a case of General Paralysis. This case was one of the few in the/

the series in which there were present definite symptoms referable to the urinary organs. This patient was suffering from a Cystitis, and the probability is that the organism was derived from the bowel and caused the lesion in the urinary bladder.

The possibility that the presence of bacteria in the urine represents some focus of infection; and that their constant passage through the Kidney will in time cause some definite local damage, is supported by the evidence obtained by examining the centrifuge deposits microscopically. The records show that pus and epithelial cells were found in practically every case. Often there was associated with these, debris and red blood corpuscles; sometimes both granular and hyaline casts. It is not claimed that the presence of a few epithelial or pus cells or an occasional cast is of any significance. But the presence of these pathological cells in excess and in conjunction with bacteria; must indicate some kidney irritation. And when the local or general vitality is lowered definite lesions can undoubtedly become established in this way. It may also be quite possible that this constant irritation may ultimately cause cirrhosis of the kidney and chronic nephritis may in this way become established.

BACTERIURIA IN CHILDREN.

The following report of the bacteriological examination of the urines of sick children is based on the examination of specimens which were received from the Royal Hospital for Sick Children, Edinburgh; through the kidness of Mr Fraser and Dr McNeill. The specimens were received numbered and without the clinical diagnosis. The age, sex, as well as the clinical diagnosis were obtained subsequently after the specimens had been examined. It is interesting to note that in the hospital records of these cases the urine was described to be free from albumin and pus and considered normal.

The appearance of the urine; the reaction to Litmus; and the description of the unstained centrifuge deposit have been added in every case.

In this section of the investigation the urines were again examined in the two ways described previously; i.e. a culture was made direct from the centrifuge deposit as well as one by putting up the urine with broth. The film findings of the broth culture are again described under "broth"; those from the Subculture under the heading "Subculture"; and in the direct culture from the centrifuge deposit under the heading "culture from centrifuge deposit".

The literature on bacteriuria in children is not very/

very extensive. J.P. Crozer Griffiths in his "Diseases of Infants and Children" states - "Organisms may be found in the urines of children "who show no constitutional symptoms, and where the "urine is free from pus. Usually one finds the "bacillus coli, and the urine may be cloudy owing to "the great number of organisms which are present. "The condition may occur at any period of life." Griffiths quotes Mellin who reported (in the Jahrbuch fur Kinderh. 1903), that he (Mellin) found only eleven such cases in the literature and added ten cases of his own. Mellin thought that the condition was a relatively rare one; though Griffiths suggests, that a systematic examination of the urine would probably show that the condition occurred much more frequently than is commonly supposed. He suggests also that it is possible that this bacteriuria is an early symptom of Pyelitis or Cystitis. John Thomson also calls attention to the fact that a Colon bacilluria, may be found without any definite kidney symptoms being present. These cases he states occur usually in association with cases which are in hospital for abdominal operations. He states too "it is possible "for a bacteriuria to occur in connection with many "other conditions; especially is this the case when "the general resistance is lowered, as for instance in "severe intestinal derangements."

The following are the records of the bacteriological findings of the urines which were sent for examination.

SECTION B.

BACTERIURIA IN CHILDREN.

1. F. 8 yrs. Tuberculous glands in Neck.

Urine turbid and Acid.

Mic.:- One or two Epithelial and Pus Cells: One or two R.B.C.: Few Bacteria: Phosphates.

Broth.	Large nos. gram pos. diplococci: good many gram neg. Bacilli.
Culture from Centrifuge deposit.	Extensive growth gram neg. B.(B.Coli): Few Staphylococci.
Subculture.	Gram neg. B. (B. Coli) 95%: gram pos. diplococci 5%.

2. F. 7 yrs. Epulis Sequestrum of Jaw.

Clear Acid Urine.

Mic.:- Good many Epithelial Cells: Few Pus Cells. Fair number Ca. Ox. Crystals. Bacteria and Phosphates.

Broth.	Large no. small gram pos. diplococci: Large No. gram pos. cocci. Fair nos. gram neg. Bacilli.
Culture from Centrifuge deposit.	Good many gram neg. B. (B.Coli). Few Streptococci.
Subculture.	Gram neg. Bacilli (B. Coli) 60%: Staphylococci 30%: Streptococci 10%.

3. M. 6 yrs. Acute Mastoid.

Turbid and Acid Urine.

Mic.:- Good many Uric Acid Crystals. Heavy deposit of Urates

Broth. - Good many gram pos. diplococci and large gram pos. cocci. Few gram neg. Bacilli and Diphtheroid B.

Culture from Centrifuge deposit. Good many gram neg. Bacilli(B.Coli): Few Streptococci.

Subculture. Gram neg. Bacilli (B. Coli) 50%: Streptococci 50%.

4. F. 6 yrs. Pneumococcal Peritonitis.

Turbid and Acid Urine.

Mic.:- Good many Epith. Cells: One or two R.B.C.: Fair number Ca. Ox. Crystals: Bacteria.

Broth. Large nos. large gram pos. cocci: Few gram pos. diplococci.

Culture from Centrifuge deposit. Large no. gram neg. Bacilli (B.Coli): Few Streptococci: good many large gram pos. cocci.

Subculture. Gram neg. Bacilli (B. Coli) 50%: Staphylococci 50%.

5. F. 9 yrs. Acute Appendicitis - Peritonitis.

Clear Acid Urine.

Mic.:- Good many Epith. Cells: good no. Pus Cells: Few R.B.C.: good many Bacteria.

Broth. Large nos. gram pos. diplococci: Few long thick gram pos. Bacilli: Few gram neg. Bacilli.

Culture from Centrifuge deposit. Good many gram neg. Bacilli: good many Streptococci.

Subculture. Gram neg. Bacilli (B. Coli) 65%: Streptococci 35%.

6. F. 9 yrs. T.B. Abscess Abdominal Wall.

Clear Acid Urine.

Mic.:- Few Epith. Cells: numerous Pus Cells: Few R.B.C.: good many Ca. Ox. Crystals: good many Bacteria.

Broth. Fair nos. gram pos. diplococci: Large no. gram neg. Bacilli.

Culture from Centrifuge deposit. Pure growth of gram neg. Bacilli (B. Coli).

Subculture. Gram neg. Bacilli (B. Coli) 70%: Streptococci 30%.

7. F. 10 yrs. Acute Obstruction T.B. Abscess.

Turbid Acid Urine.

Mic.:- Good many Epith. Cells: numerous Pus Cells: Few Ca. Ox. Crystals: good many Bacteria.

Broth. Good many gram neg. B.: good many gram pos. diplococci; good many diphtheroid B.: few thick gram pos.B.

Culture from Centrifuge deposit. Large no. Staphylococci: Fair no. Streptococci and gram neg. Bacilli.

Subculture. Gram neg. B. (B. Coli) 80%: Streptococci 20%.
Spore bearing organism B. Subtilis present.

8./

8. F. 8 yrs. Infantile Paralysis.

Turbid Acid Urine.

Mic.:- Large no. Epith. Cells: Fair no. Pus Cells: Few R.B.C.: Few Ca. Ox. Crystals: Fair no. Bacteria.

Broth. Large no. gram pos. diplococci: Fair no. gram neg. Bacilli: Diphtheroid Bacilli and some thick gram pos. Bacilli.

Culture from Centrifuge deposit. Good many gram neg. Bacilli: Few Staphylococci and streptococci.

Subculture. Gram neg. B. (B. Coli) 90%: Staphylococci 10%.

9. F. 6 yrs. T.B. Cervical Glands.

Fairly clear, amphoteric urine.

Mic.:- Few Epith. Cells: Large no. Pus Cells: Few R.B.C.: good many Triple Phosphate crystals: Bacteria.

Broth. Good many gram neg. B.: large no. gram pos. diplococci: Few pos. B.

Culture from Centrifuge deposit. Pure growth Staphylococcus Albus.

Subculture. Gram neg. Bacilli (B.Coli) 90%: Staphylococci 10%.

10. F. 10 yrs. Post Operative Ventral Hernia.

Clear Acid Urine.

Mic.:- Few Epith. Cells: good many Pus Cells: Large no. Ca. Ox. Crysts: Few Bacteria.

Broth. Large no. gram pos. diplococci: Few gram neg. Cocco-Bacilli.

Culture from Centrifuge deposit. Mixture of Staphylococci and a spore-bearing organism (B. Subtilis).

Subculture. Gram neg. Bacilli (B.Coli) 95%: Staphylococci 5%.

11. F. 8 yrs. Infantile Paralysis (Acidosis).

Turbid Acid Urine.

Mic.:- Heavy deposit of Urates.

Broth.	Fair nos. gram neg. Bacilli and gram pos. diplococci.
Culture from Centrifuge deposit.	Sterile.
Subculture.	Gram neg. B. (B. Coli) 95%: gram pos. diplococci 5%.

12. F. 8 yrs. Congenital Dislocation of Hip.

Clear Acid Urine.

Mic.:- Few Epith. Cells: good no. Pus Cells: one or two R.B.C.: Few Bacteria.

Broth.	Large nos. gram neg. Bacilli and gram pos. diplococci.
Culture from Centrifuge deposit.	Gram neg. Bacilli 90%: gram pos. diplococci 10%.
Subculture.	Gram neg. B. (B. Coli) 95%: gram pos. diplococci 5%.

13. F. 6 yrs. Pneumococcal Peritonitis.

Clear Acid Urine.

Mic.:- Few Epith. Cells: Few Pus Cells: good many Ca. Ox. Crystals: Few Bacteria.

Broth.	Large nos. gram neg. Bacilli and gram pos. diplococci.
Culture from Centrifuge deposit.	Gram neg. B. 95%: gram pos. diplococci 5%.
Subculture.	Gram neg. B. (B. Coli) 85%: large gram pos. diplococci 10%: Streptococci 5%.

14. M. 9 yrs. Operated for enlarged Tonsils.

Clear Acid Urine.

Mic.:- Few Epith. Cells: Fair no. Pus Cells: good many Ca. Ox.Crystals: Few R.B.C. Few Bacteria.

Broth. Large nos. gram pos. diplococci: good many gram neg. Bacilli.

Culture from Centrifuge deposit. Gram neg. Bacilli 60%: gram pos. diplococci 40%.

Subculture. Gram neg. B. (B. Coli) 60%: gram pos. diplococci 40%.

15. F. 10 yrs. Infantile Paralysis.

Clear Acid Urine.

Mic.:- Few Epith. Cells: Few Pus Cells: One or two R.B.C.: Large no. Ca. Ox. Crystals. Few Bacteria.

Broth. Large no. gram pos. diplococci: good many gram neg. Bacilli.

Culture from Centrifuge deposit. Gram neg. Bacilli 70%: Staphylococci 30%.

Subculture. Gram neg. B. (B. Coli) 95%: Staphylococci 5%.

16. F. 7 yrs. Tuberculous Pulmonary Root Glands.

Clear Acid Urine.

Mic.:- One or two Epith. Cells: One or two Pus Cells: Slight amount of debris: Few Bacteria.

Broth. A few gram pos. diplococci.

Culture from Centrifuge deposit. Sterile.

Subculture. Pure growth Staphylococcus Albus.

17. F. 5 yrs. Pyrexia (Cause unknown - 4 days duration).

Clear Acid Urine.

Mic.:- Few Epith. Cells. Few Pus Cells. Few R.B.C.: Few Bacteria.

Broth. Good many gram pos. diplococci.

Culture from Centrifuge deposit. Sterile.

Subculture. Pure growth Staphylococcus Albus.

18. M. 11 yrs. Pleural Effusion. (Tubercular)

Very clear, pale, acid urine.

Mic.:- Good many Epith. Cells: Few Pus Cells: one or two R.B.C.: Bacteria.

Broth. Large number gram pos. cocci.

Culture from Centrifuge deposit. Sterile.

Subculture. Pure growth Staphylococcus Albus.

19. M. 6 yrs. Chronic Empyema with Intermittent fever.

Turbid, uratic, Acid Urine.

Mic.:- Ca. Ox. Crystals & urates only.

Broth. Fair nos. gram pos. diplococci: good many large gram pos. cocci.

Culture from Centrifuge deposit. Sterile.

Subculture. Pure growth Staphylococcus (Albus).

20./

20. F. 4 yrs. Strumous Keratitis and Lupus of Nose.

Very clear, pale, acid urine.

Mic.:- Few Epith. Cells: one or two
Pus Cells: Fair no. Ca. Ox.
Crystals: debris. Bacteria.

Broth. Large no. gram pos. cocci: good many gram pos. diplococci.

Culture from Centrifuge deposit. Sterile.

Subculture. Pure growth Staphylococcus Albus.

21. F. 7 yrs. Chorea (no Rheumatic infection).

Very clear, pale, acid urine.

Mic.:- Few Epith. Cells: one or two
Pus Cells: slight amount of debris: Bacteria.

Broth. Good many gram neg. Bacilli: Fair no. gram pos. diplococci.

Culture from Centrifuge deposit. Gram neg. Bacilli (B. Coli) 95%: gram pos. diplococci 5%.

Subculture. Gram neg. Bacilli (B. Coli) 95%: Streptococci 5%.

22. F. 6 yrs. T.B. Peritonitis.

Clear Acid Urine.

Mic.:- Good many Epith. Cells: Fair no.
Pus Cells: one or two R.B.C.:
Fair amount debris. Bacteria.

Broth. Large no. gram neg. Bacilli: good many gram pos. diplococci.

Culture from Centrifuge deposit. Staphylococci 70%: gram neg. Bacilli 30%.

Subculture. Gram neg. Bacilli (B. Coli) 60%: Staphylococci 40%.

23. F. 4 yrs. T.B. Cervical Glands.

Turbid, uratic, acid urine.

Mic.:- One or two Pus Cells: amorphous urates.

Broth.	Large no. gram neg. Bacilli: Fair no. gram pos. diplococci.
Culture from Centrifuge deposit.	Gram neg. Bacilli (B. Coli) 90%: Staphylococci 50%.
Subculture.	Gram neg. Bacilli (B.Coli) 50%: Streptococci 50%.

24. F. 6 yrs. Infantile Paralysis.

Clear Acid Urine.

Mic.:- Few Epith. and Pus Cells: one or two R.B.C.: Large no. Ca. Ox. Crystals: Casts: Bacteria.

Broth.	Large no. gram neg. Bacilli: Fair no. gram pos. diplococci.
Culture from Centrifuge deposit.	Gram neg. Bacilli (B. Coli) 98%: Streptococci 2%.
Subculture.	Gram neg. Bacilli (B. Coli) 95%: Streptococci 5%.

25. M. 8 yrs. Enlarged Tonsils.

Clear Acid Urine.

Mic.:- Very large no. Epith. Cells: one or two Pus Cells, and R.B.C.: Large no. Ca. Ox. Crystals. Bacteria.

Broth.	Large no. gram neg. Bacilli: Fair no. gram pos. cocci and diplococci.
Culture from Centrifuge deposit.	Gram neg. Bacilli (B. Coli) 50%: Staphylococci 50%.
Subculture.	Gram neg. Bacilli (B. Coli) 60%: Staphylococci 40%.

26. F. 7 yrs. T.B. Cervical Glands.

Clear Acid Urine.

Mic.:- Few Epith. Cells: large no. Pus Cells: Few R.B.C. Bacteria.

Broth.	Large no. gram neg. Bacilli: Fair no. gram pos. diplococci.
Culture from Centrifuge deposit.	Gram neg. Bacilli and Leptothrix 95%: gram pos. diplococci 5%.
Subculture.	Gram neg. Bacilli (B. Coli) 90%: Streptococci 10%.

27. F. 5 yrs. Pneumococcal Peritonitis.

Clear Acid Urine.

Mic.:- Consists entirely of Bacteria.

Broth.	Large no. gram neg. Bacilli: Few gram pos. diplococci.
Culture from Centrifuge deposit.	Gram neg. Bacilli (B. Coli) 95%: Streptococci 5%.
Subculture.	Gram neg. Bacilli (B. Coli) 60%: large gram pos. diplococci and streptococci 40%.

28. F. 5 yrs. T.B. Peritonitis.

Clear Acid Urine.

Mic.:- Few Epithelial and Pus Cells: Few R.B.C.: Bacteria.

Broth.	Large no. gram neg. Bacilli: Large no. gram pos. diplococci and gram pos. Bacilli.
Culture from Centrifuge deposit.	Gram neg. Bacilli (B. Coli) 95%: Streptococci 5%.
Subculture.	Gram neg. Bacilli (B. Coli) 95%: Streptococci 5%.

case.	Glucose.	Lactose.	Maltose.	Saccharose.	Dulcite.	Mannite.	Inulin.	Salicin.	Gelatin.	Litmus Milk.	Indol.	Motility.
1.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
2.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
3.	-	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
4.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
5.	A&G	A&G	A&G	A&G	A&G	A&G	-	-	-	A & Clot	+	+
6.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
7.	A&G	A&G	A&G	A&G	-	-	-	-	-	A & Clot	+	+
8.	A&G	A&G	A&G	A&G	-	A&G	-	-	-	A & Clot	+	+
9.	A&G	A&G	A&G	A&G	A&G	A&G	-	-	-	A & Clot	+	+
10.	A&G	A&G	-	A&G	-	A&G	-	-	-	A & Clot	+	+
11.	A&G	A&G	A&G	A&G	-	A&G	A&G	-	-	A & Clot	+	+
12.	A&G	A&G	A&G	-	-	A&G	-	-	-	A & Clot	+	+
13.	A&G	A&G	A&G	-	-	A&G	-	-	-	A & Clot	+	+
14.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
15.	A&G	A&G	-	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+

Case.	Glucose.	Lactose.	Maltose.	Saccharose.	Dulcite.	Mannite.	Inulin.	Salicin.	Gelatin.	Litmus Milk.	Indol.	Motility.
21.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
22.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
23.	A&G	A&G	A&G	A&G	A&G	A&G	-	A	-	A & Clot	+	+
24.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
25.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
26.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
27.	A&G	A&G	A&G	A&G	A&G	A&G	-	A&G	-	A & Clot	+	+
28.	A&G	A&G	A&G	A&G	A&G	A&G	-	A	-	A & Clot	+	+

It is of interest that in this series of twenty-eight cases, in only eight instances was the urine turbid. In four of these the turbidity was obviously due to the presence of urates. In the other four the turbidity was due to the presence of organisms. All the rest of the specimens were clear urines, some were in fact very pale and clear.

In no instance was a sterile urine found when the urine was examined in the manner which is advocated by Panton. The fact that organisms were found in every case shows that though a urine is clear it may still be the vehicle for organisms. It is of interest to note that in some instances when the centrifuge deposit was transferred direct on to the solid culture medium, negative results were obtained. This occurred in six cases, four being females and two males. With the exception of Case 11 it was noticed that these negative results were obtained only when the Staphylococcus was obtained from the subculture made from the broth. In cases where both gram negative and gram positive organisms were obtained from the subculture, a growth is always obtained from the culture made direct from the centrifuge deposit. Case 11 was one of Infantile Paralysis complicated by an acidosis. This latter was demonstrated by the presence of acetone in the urine. This may have had

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an influence on the growth and development of the organisms, and may account for the sterile tube obtained from the centrifuge deposit.

It is difficult to account for the fact that only one type of organism grew when a sterile result was obtained by the other method of examination. If this method only is used it may be quite possible that when the urine contains no gram negative organisms a sterile result may be obtained. These facts are perhaps the strongest support in favour of the method of examinations of urines advocated by Panton. Both types of organism grow equally readily and there is no adequate reason why the growth of the gram negative organism should be inhibited.

The urines were in all cases free from Albumen, Sugar and Pus. In every case, with the exception of Case 9, the urines were acid in reaction. In Case 9 it was amphoteric, due probably to the triple phosphates which were present.

The organisms which were found in this series were:-

B.Coli and gram positive diplococci	4 times	14.3%
B.Coli, Streptococci & Staphylococci	Once	3.6%
B.Coli and Streptococci . .	9 times	32.1%
B.Coli and Staphylococci . .	7 times	25.0%
B.Coli gram positive diplococci and Streptococci . .	Twice	7.1%
Staphylococci	5 times	17.9%

Again as in the previous series the Colon bacillus is again frequently present. Again there is no pure Streptococcal infection, though a mixed infection is fairly frequent. In all cases the growth on the MacConkey medium was very profuse. The Colon bacilli all gave the typical biochemical reactions. There were however some modifications. In Case 3 Glucose was not affected at all. In cases 10 and 15 Maltose was not affected. In Case 11 acid and gas was produced from Inulin. Acid and gas was produced from Dulcite in cases 7 and 9, and also in the last ten reactions. In these ten cases acid and gas was also produced from Salicin. In Cases 23 and 28 acid only was produced from Salicin.

In all cases Acid and Clot was produced from the Litmus milk; Indol from the peptone water; and organisms were motile and in no case was the gelatine liquified.

As in the former series pus and epithelial cells, red blood corpuscles were found in the microscopical examination of the centrifuge deposit. In no case in this series was there any clinical indication of Kidney mischief. This is especially interesting, for in every case there was present this excess of cells in the urine, and it was always associated with a bacteriuria.

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The constant passage of organisms through the Kidney must, as Griffiths and Thomson suggest, cause definite irritation of the delicate Kidney substance. In this way the seeds of future Kidney disease may be sown; and later in life when some lowering of the resistance occurs a definite Kidney lesion may be set up.

SUMMARY.

The conclusions which can be drawn from this investigation must chiefly be of a tentative character. Roberts' conception that the fresh and healthy urine is free from bacteria must be modified. It is evident from the numbers and types of cases examined that a bacteriuria is of more frequent occurrence than is usually suspected or recognised. It has been shown by Panton that a Bacteriuria may occur even in apparently healthy individuals.

It is quite possible that some cases of bacteriuria are due to 'contamination' of the urine from the deeper parts of the urethra and other parts of the genito urinary tract. Cases of this nature must be comparatively infrequent in comparison with the number of cases in which a bacteriuria indicates a transient bacteriaemia; the organisms being filtered off from the blood by the kidneys, and subsequently passed out of the body. While this filtration of bacteria may go on for a long period of time; and account possibly for the cases of bacteriuria in apparent health; Griffith's/

Griffith's suggestion that a persistent bacteriuria may be the forerunner of cystitis and pyelitis should not be lost sight of.

These individuals who are thus more or less constantly passing bacteria in their urine might quite conceivably be placed among that group of individuals known as 'carriers'; these 'carriers', however, differ from the ordinary well known typhoid 'carrier'. The typhoid 'carrier' is never a danger to himself but a constant menace, and means of spreading the infection to others. The Colon bacillus 'carrier' is seldom a danger to others but is always a potential enemy to himself. Any lowering of general or local resistance, any factor which causes an exaltation of virulence of the bacteria will cause a definite lesion to become established.

The question of catheter specimens has been raised, and while more elaborate and a greater number of comparisons of the two methods are required, one is I think justified in assuming that the urine obtained by the method used is a reliable specimen to examine for a bacteriuria. The specimens were collected and examined with adequate care. It has been indicated too, that some of the bacteria may not have been passed through the kidney. The very few instances however in which a sterile result was obtained/

obtained shows that a bacteriuria occurs with greater frequency than is commonly thought to be the case.

This passage of bacteria through the mucous membranes without the causation of any demonstrable lesion may be as Adami has shown the cause of a great many of the chronic ailments. Bacteria pass from one tissue to the other, and while the individual is in good health, no untoward results occur; but when the resistance is lowered the individual becomes a prey to this 'subinfection' and definite pathological entities are established. This is not only true of these common saprophytic bacteria, for Calmette has shown that the tubercle bacillus may gain entrance into the body, through the mucous membranes without causing any lesion therein. Once in the body these organisms are capable, should circumstance arise, of setting up disease.

Arbuthnot Lane has pointed out "that the resist-
"ing power to the entry of organisms into the several
"tissues of the body is very materially influenced by
"the autointoxications. This is especially illus-
"trated in Rheumatoidal and Tuberculous conditions,
"and it applies equally to many other diseases both
"of an acute and chronic nature." It seems evident therefore that where a chronic focus of disease is already established; the resisting power of the tissues are/

are already below par; and renders them more pervious to the passage of bacteria. Any aggravation of the condition or the establishment of new pathological processes will show themselves by the migration of bacteria, and these can easily be demonstrated in the urine. Cases of this nature have been recorded by Eurich who reported three cases of Colon bacillus bacteriuria. The cases were (a) strain causing orchitis, (b) blow on testis causing orchitis, (c) conjunctivitis and iritis. In each instance the infection was by the blood. The cases recovered completely under treatment with autogenous vaccines.

Lane maintains that it is the absorption of bacterial toxins from the bowel and elsewhere which inaugurates diseased processes. Kidd on the other hand maintains that the bacteria themselves migrate and pass through the various organs of the body and so cause disease. This investigation shows that there is much to support this view. The organisms pass through the bowel into the blood and those that the body cannot destroy are passed through the kidney. The associated conditions such as chill, fatigue, constipation, chronic appendicitis, which tend to lower general tissue resistance enable these organisms in time to get the upper hand and cause definite local damage.

It would thus seem that the appearance of cellular elements in excess in the centrifuge deposit is an indication and a warning that damage has to a certain extent already been done to the kidney. It is quite possible too that if this condition of irritation is of a sufficiently persistent character a condition analogous to chronic nephritis may become established. It may be possible too, to explain in this way the cases of Idiopathic bacterial Nephritis.

C O N C L U S I O N S.

I. The frequency in which a bacteriuria may be demonstrated both in adults and children who are not at the time suffering from an acute bacterial infection of the kidney.

II. The apparent advantage of first incubating the carefully taken specimen of urine with an equal amount of nutrient broth; and subsequently making a subculture.

III. The possibility that a bacteriuria may be the indication of incipient kidney disease, either of a subacute or chronic type of disease.

IV. The possibility that a bacteriuria may indicate a smouldering focus of infection in any region of the body.

I wish to express my thanks to Dr Chalmers Watson for permitting me to carry out this investigation in his laboratory; and for his kindness and advice to me while the work was in progress.

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